

KISS ESC

32A

KISS - Keep it super simple. Manual v1.0 for the KISS 32A ESC

Special Features

- 32-bit ARM Cortex M4 MCU @80Mhz
- Telemetry capability (voltage, current, temperature, rpm)
- Over current protection (measures the current and reduces it to max 40A)
- Over temperature protection (reduces the max power if hotter than 100°C)
- **sinHybrid :: Sinwave/BackEMF Hybrid** Commutation for smoother running.
- Dshot 2400 (Full resolution of 2000 steps takes only 6.5µs)
- Supports all common Dshot commands like turtle mode, 3D mode and rotation direction change.
- Expanded adaptive auto timing (3,25-30° advance on each commutation)
- For Race Multicopters (32A continuous also with weak cooling)
- High max. RPM (500.000ERpm, 71.400Rpm with a 14Pole Motor)
- Small size (19 x 27 mm)
- Accurate RPM control (2000 steps using Dshot)
- No additional capacitor needed for 3-5S. **Add a min. 220µF min. 50V Cap for 6S usage!**
- Very fast throttle response
- Linear throttle response
- Active freewheeling (low diode losses)
- Regenerative braking
- 3-6S LiPo
- Dshot 100-2400, Oneshot42, Oneshot125 and normal (25 – 500Hz) PWM auto detected.
- Supports FrSky Sbus, Graupner SumD, TBS CROSSFIRE and Multiplex SRXL as well as the Telemetrys, S-Port, Graupner HOTT, TBS CROSSFIRE and Sensorbus

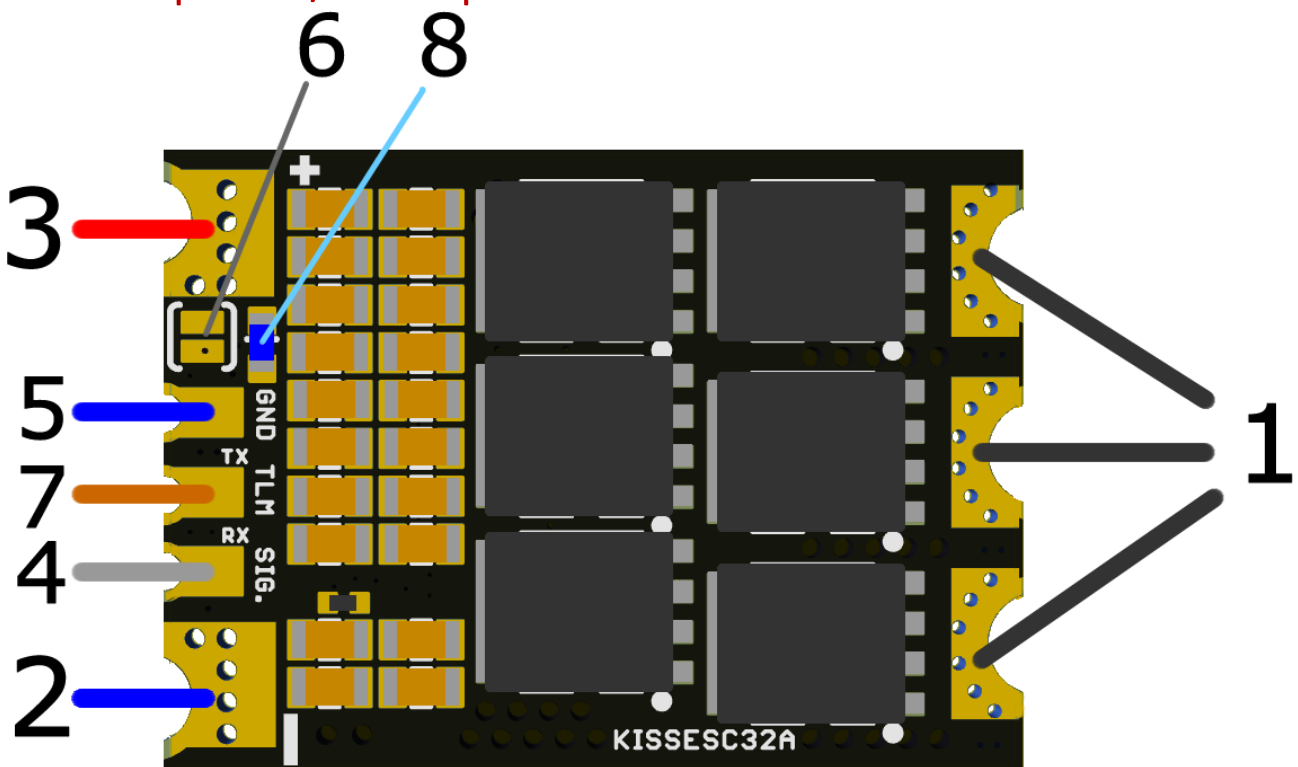
Technical details

- Operating voltage 9 - 30V (3-6s)
- Maximum continuous current 32A
- Instantaneous maximum current 40A, actively limited
- 600000 ERPM maximum rotation field speed (usage up to 500000 recommended)

Safety Warnings

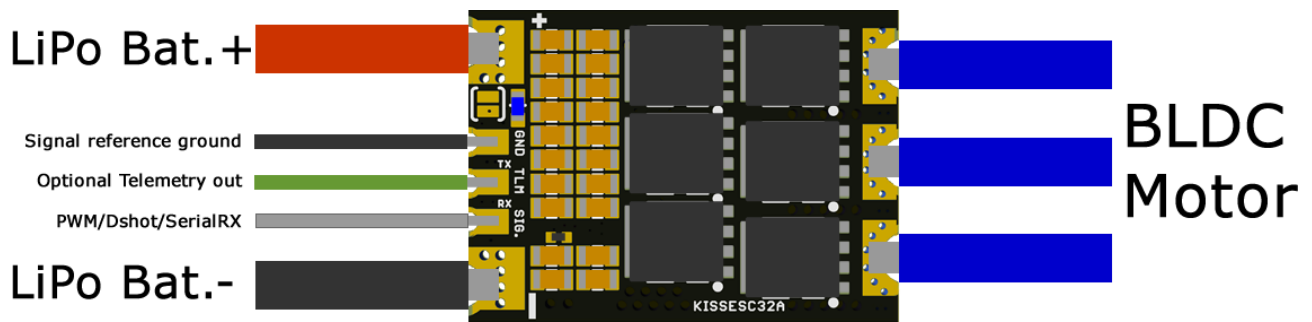
- Due to the regenerative braking, the KISS ESC should **only be powered by LiPo batteries**. A power supply might get damage when braking. The ESC takes care of itself.
- Never start a brushless motor in your hands!
- While starting up with propellers mounted, always do it in a distance of yourself & objects
- The KISS ESC can be locally heated up to 80 ° C during operation!
- While soldering do not connect a voltage source at the ESC / speed controller.
- Some components on the KISS ESC can be destroyed by static charge. When handling such electronics, make sure to be grounded.

Description/Components



1. Solder contacts for motor-phase connections
2. LiPo Power supply GND -
3. LiPo Power supply +
4. PWM/Dshot signal input (servo signal)
5. PWM/Dshot signal GND (ground reference)
6. Solder jumper to set the direction of rotation (also in 3D mode)
7. Telemetry (e.g. On the KISS FC connected to TRX/TLM)
8. Status LED (indicates validity of the input signal)

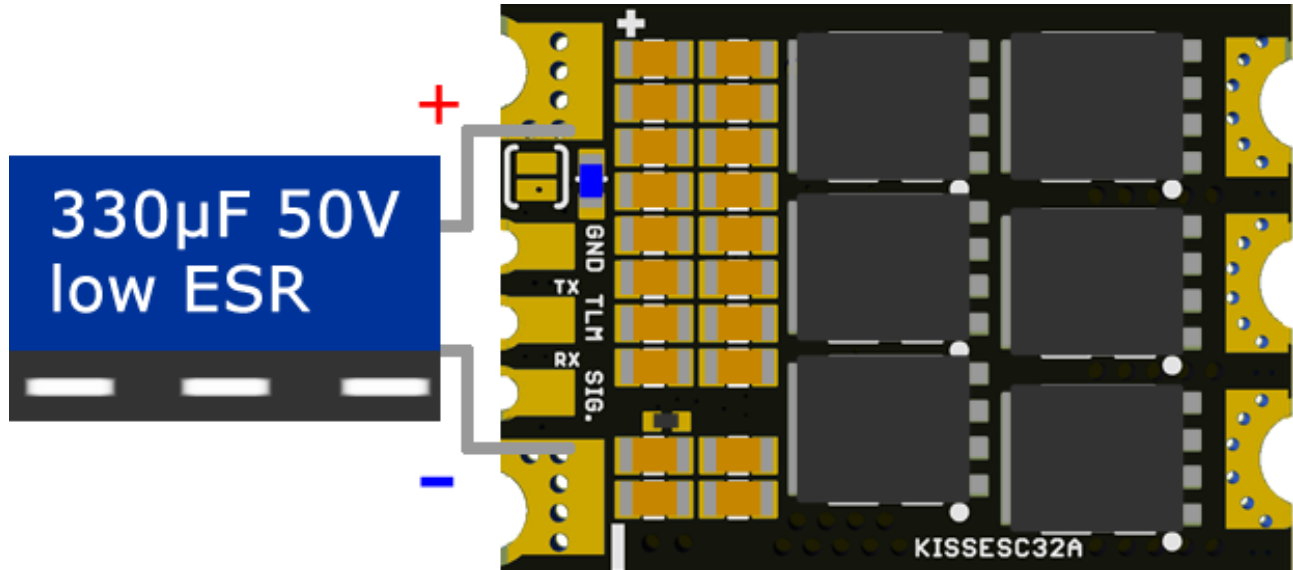
Soldering wires



Commissioning of the ESC / speed controller for a brushless electric motor:

- Soldering each of the three motor cables to each one of the three solder pads (1)
- LiPo power cable with plug solder (2 + 3). IMPORTANT!!! Note polarity, otherwise the ESC / controller is immediately destroyed when connecting the power supply. The LiPo can also be damaged.
- Solder signal cable, white or yellow cable (4), the black wire to (5)

Add a Capacitor for 6S LiPo use



ESC/speed controller settings

- A) Programming the throttle range (stick programming) Optional: 3D mode
- B) Set the direction of motor rotation (6)

IMPORTANT!!! Change motors setting without propeller mounted, risk of injury!

A) Since the KISS32A have very accurate resonators, a throttle calibration isn't really needed. The default setting is 1000 μ S Min signal, 1050 μ S Start signal and 2000 μ S full Throttle signal. To teach the transmitter path (throttle path) the ESC / controller must be connected to a receiver or FC, set the throttle signal at full throttle (peak throttle). Connect the LiPo to the ESC / controller. A beep indicates the confirmation that the programming mode is activated. Now reduce the throttle signal to minimum (normally 1000 μ s), and wait for the restart of the speed controller (audible signal high-low-high). The throttle pas is now programmed and the ESC/controller is ready for use.

Caution: The loads that arise for the ESC in the 3D mode, are up to 3 times higher!

3D mode: After the throttle travel has been programmed as described, the 3D mode can be activated as follows: Disconnect the power supply, put the transmitter signal at full throttle, connect power again, wait for the beep. Adjusting the throttle to the middle position (half throttle path) and wait for restart of the ECS/ speed controller (signal: high-low-high). The 3D mode is now active. Important! Speed controller now starts only at the throttle center position. Deactivation: Teach new master travel (A).

B) On delivery JP1 (6) is open. If a change of direction of motor rotation is desired, the jumper can be closed. Close the jumper by adding solder to the pads → building a solder bridge

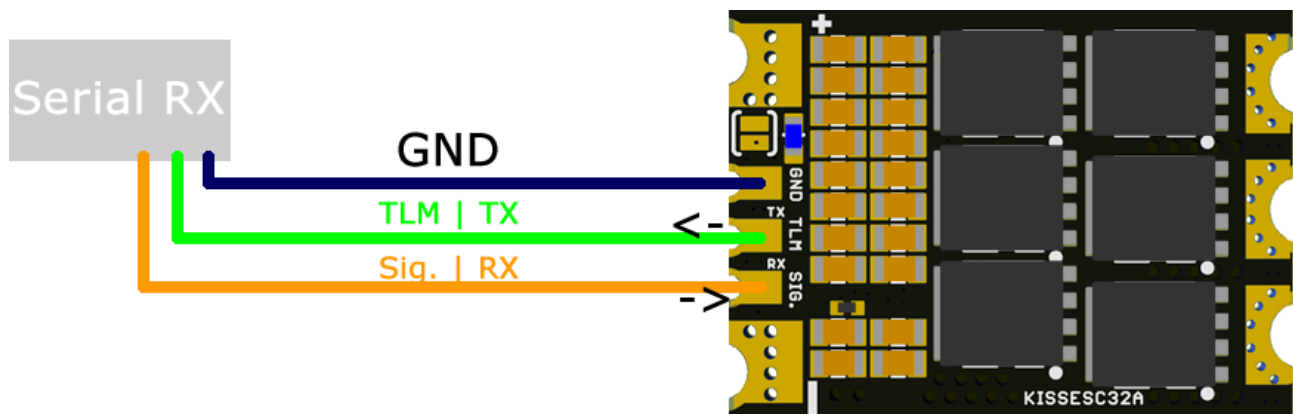
Functionality

After powering up the KISS ESC (attaching a Lipo battery) the LED (8) lights up for about half a second and the motor beeps (high-low-high). If the ESC receives a valid PWM/Dshot signal, the LED (8) lights up again and stays on and there is one more long beep.

Now the KISS ESC is armed and ready to start the motor. If the LED goes off, it means that the input signal is no longer valid. If the motor is blocked while running (eg crash), the KISS ESC disables itself after several failed start attempts to protect the engine from damage.



Serial Receiver support



The KISSESC32A supports Serial Receivers. It auto detects on the input (Sig. | RX). As it doesn't deliver 5V, the Receiver must be powered externally.

1. FrSky Sbus and S-Port.

Connect the Sbus Output to Sig. | RX pin. And if you need Telemetry connect S-Port to TLM | TX. If a valid Sbus signal is detected, S-Port becomes active automatically.

The ESC uses Sbus channel 0 as default throttle channel. It can be changed in the CLI interface.

For S-Port its default sensor address is 27. It can be changed in the CLI interface.

Available telemetry:

- Voltage (Volt)
- Current (Ampere)
- Consumption (mA/h)
- Temperature (°C)
- RpM (Default for 14 Magnetpole Motor, configurable in CLI)

2. Graupner SumD and HOTT

Connect the SumD Output to Sig. | RX pin. And if you need Telemetry, HOTT to TLM | TX. If a valid SumD signal is detected, HOTT gets automatically active.

The ESC uses as default throttle channel SumD channel 0. it can be changed in CLI interface.

In the HOTT telemetry it will be found as Electricl Air Module.

Available telemetry:

- Voltage (Volt)
- Current (Ampere)
- Consumption (mA/h)
- Temperature (°C)
- RpM (Default for 14 Magnetpole Motor, configurable in CLI)

3. Multiplex SRXL and Sensorbus

Connect the SRXL Output to Sig. | RX pin. And if you need Telemetry, Sensorbus to TLM | TX. If a valid SRXL signal is detected, Sensorbus gets automatically active.

The ESC uses as default throttle channel SRXL channel 3. it can be changed in CLI interface.

It uses Sensorbus ID 2-6. configurable in CLI

Available telemetry:

- Voltage (Volt)
- Current (Ampere)
- Consumption (mA/h)
- Temperature (°C)
- RpM (Default for 14 Magnetpole Motor, confugurable in CLI)

4. TBS CROSSFIRE

Connect the CRSF TX Output to Sig. | RX pin. And if you need Telemetry, CRSF RX to TLM | TX.

The used throttle channel is CRSF channel 0

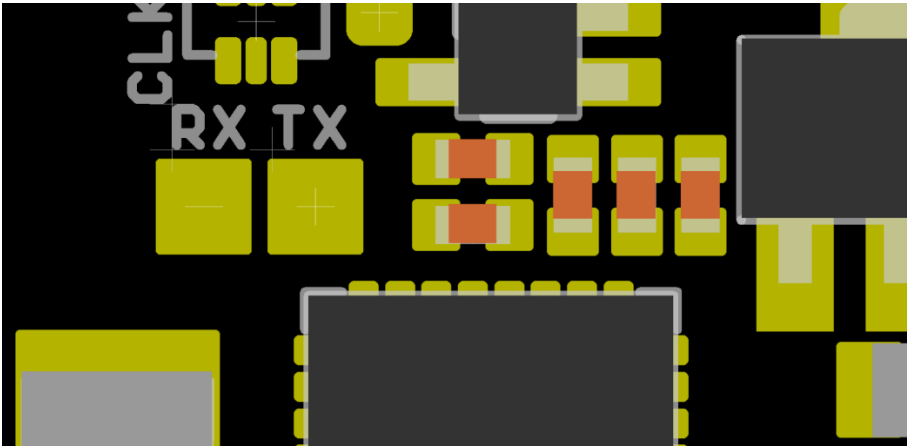
Available telemetry:

- Voltage (Volt)
- Current (Ampere)
- Consumption (mA/h)

CLI (Command Line Interface)

note: the CLI Settings are only needed if you want to setup special things like using two ESC's on one Sbus or S-Port. For normal Copter usage it is not needed.

You will need a USB-UART adapter (like FTDI or CP2102) to use the CLI.



The RX and TX Pads for it are on the bottom side of the ESC

Connect the USB-UART like this:

ESC		USB-UART
RX	↔	TX
TX	↔	RX
GND	↔	GND

Its important that the USB-UART is powered at the same moment, or before the ESC gets power. Else the ESC disables the UART for safety reasons.

On the PC side, use a serial monitor like PuTTY or Arduino serial monitor. Choose the USB-UARTs COM-PORT and select 115200 baud. In Arduino serial monitor choose also active linewarp.

If you enter now „help“ it should replay:

```
>TLM: print telemetry
>REST: restore defaults
>INFO: system information
>CLxx: set current limit to xx=01...40[A]
>MMxx: set Motor Magnet count. xx=02...98
>SBx: set FRsky Sbus Chan. x=0...7
>SPxx: set FRsky S-Port ID xx=00...27
```

>SRx: set MPX SRXL Chan. x=0...7
>MSxx: set MPX Sensorbus offset xx=00...11
>SDx: set GR SumD Chan. X=0...7

Software updates

The KISSESC32A comes with a KISS bootloader to gain easy updates using the signal input wire over a FC or USB-UART.

Software update through the KISSFC

Here you dont need to change any connection as the wiring is similar to how it is needed to fly

1. remove all propellers!
2. connect the FC to your PC
3. power the ESC's
4. open the KISS GUI and connect to the FC
5. go to ESC Flasher tab, select a FW and start the flash process.

Software update through Betaflight

you will need the KISS Flash Loader app.

1. remove all propellers!
2. connect the FC to your PC
3. power the ESC's
4. open the Betaflight GUI, go to CLI and type in „escprog ki 255“
5. close the com port!
6. open the KISS Flash Loader and select USB-UART
7. select the firmware you like to flash and start the Flash process

Software update via USB-UART

you will need the KISS Flash Loader app.

Connect the USB-UART like that:

ESC		USB-UART
-----	--	----------

Signal in	↔	TX
-----------	---	----

GND	↔	GND
-----	---	-----

1. remove all propellers!
2. connect the USB-UART to your PC
3. power the ESC
4. open the KISS Flash Loader and select USB-UART
5. select the firmware you like to flash and start the Flash process.



Important note: if the update fails for any reason, the bootloader will stay alive. Fast LED flashes means it stays in bootloader mode, slow LED flashes means it could not start the loaded software because it is not valid. To make sure to catch the bootloader after a failed software update do:

1. power the FC, prepare everything but dont power the ESC's.
2. Press the start button and power the ESC's one second after that.

Failure Analysis

Error:

Solution:

The ESC shows no reaction

Check the power supply (LiPo terminal 2 and 3)
LiPo connected?

The LED (8) lights up after connecting the power plug but then stays off.

1. Check signal connections (4 or 5).
2. Teach the master travel again (see ESC/ speed controller settings).

The engine trundles only and does not rotate properly

Check the 3 motor connections (1) on contact (some motor cables are painted and must be stripped).

The Copter loses power after some time.

The ESC goes into its temperature protection. Reduce the load or give it more cooling.

The Copter jerks at full speed

1. the ESC might go to its overcurrent protection. In this case it reduces its max current to 40A. This reduction can confuse the FC. Please lower the load in this case.

The ESC does short beeps.

1 beep each second: too many Dshot errors.
2 beeps each second: the ESC disarmed because of a too long period without a valid input signal.
3 beeps each second: the motor was blocked or couldnt get startet.